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JOINT AMSAA/TARCOM PROCUREMENT MANPOWER STUDY.(U)

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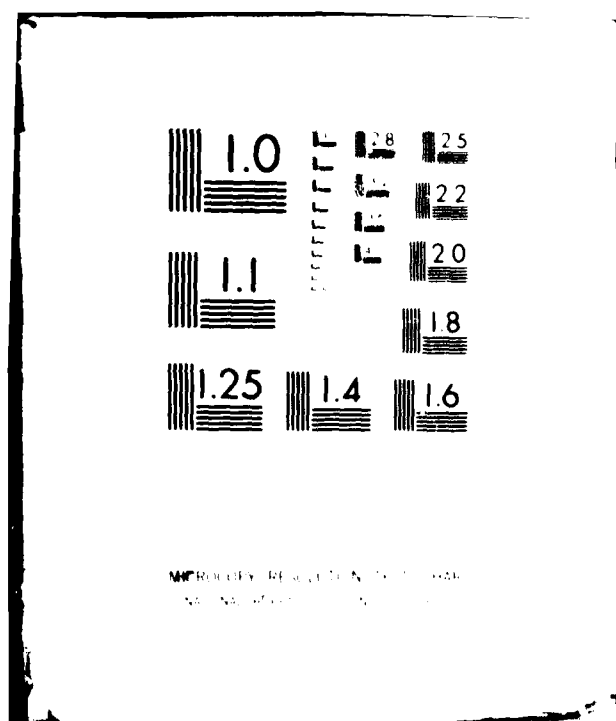
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JOINT AMSAA AND TARCOM PROCUREMENT MANPOWER STUDY

1. INTRODUCTION

1.1 Objectives.

This report describes a quantitative methodology, developed jointly by personnel from the USA Materiel Systems Analysis Activity (AMSAA) and the US Army Tank Automotive Readiness Command (TARCOM) for estimating the manpower needed to perform a Command's Central Procurement Activity workload. This activity is identified in the Army Management Structure (AMS) Code by Program Element (PE) 721113. Specifically, the methodology provides estimates of the man-years required to perform the workload in the Procurement Operations (721113.1) and Contract Administration (721113.2) subelements of 721113. The methodology does not address the Quality Assurance subelement (721113.3) which is a product assurance function and not considered to be a part of the procurement workload.

Once defined, the methodology is exercised to produce estimates of the man-years of effort required to accomplish the projected FY-79 workload of TARCOM's Production and Procurement (P&P) Directorate. Finally the limitations of the proposed methodology and its applicability to other commands are also discussed.

1.2 Background.

Since the peak of the Viet Nam war, the total authorized strength of the USA Materiel Development and Readiness Command (DARCOM) has been reduced from 183,000 personnel to the current low of 117,200. The DARCOM BASELINE Study (Reference 1), performed under the direction of MG R. L. Bergquist, the DARCOM Deputy Commanding General for Resource Management, has quantified the impact of this drawdown on DARCOM's capability to perform its major functions. That study also provides estimates of the minimum number of personnel required in the Readiness, Research and Development and Headquarters portions of DARCOM in order to achieve peacetime efficiency and have a reasonable capability to react in a mobilization/surge situation.

(1) The DARCOM Manpower Baseline Requirement; Aug 1978, DARCOM Alexandria, VA.

The BASELINE Study noted particular problems in the procurement area. For example, Figure 1.1 shows the decline in authorized procurement personnel between FY74 and FY78. However, even though the efficiency of the remaining personnel may have increased, as measured by the growing number of PA's (Procurement Actions) accomplished, due to the increasing number of PA's to be processed, the excess backlog reached an all time high of 43,000 PA's. This backlog dwarfs the desirable backlog level of 15,000 PA's and seriously limits DARCOM's efforts to obligate its procurement funds. The growth over time of the excess backlog is also shown in Figure 1.1.

The problem is being compounded by a growing percentage of procurement actions for "large" dollar amounts (>\$10K), which require significantly more effort than those of lower value. (Figure 1.2).

All of DARCOM's operations have been affected by the continuing wave of personnel reductions, dollar shortages and grade limitations. The impact of these shortfalls on PE 721113, the Central Procurement Activities, has been especially severe and reflects DARCOM's inability to obtain the goods and services required to support the Army's programs, personnel and fielded materiel. There is also concern that, in an attempt to increase obligations, the Contract Administration aspect of our procurement operations has suffered. In short, the procurement situation is bad and growing worse.

In recognition of this situation, MG Bergquist tasked AMSAA and TARCOM to collaborate on an effort to develop a quantitative methodology for estimating the amount of effort, in terms of man-years, which a command requires in order to adequately perform its procurement mission. The results of the work performed under this task are presented in this report.

1.3 Participating Organizations.

The initial phase of the effort was the development of the study approach and methodology, which had, of course, to consider the availability of pertinent data from the P&P Directorate of TARCOM as well as from other commands. The Systems Methodology Branch, Combat Support Division, AMSAA, planned the general approach and methodology in collaboration with the TARCOM Systems Analysis Division, Plans and Analysis Directorate and with guidance from the Directorate of Production and Procurement, Headquarters, DARCOM. The TARCOM Procurement Analysis and Compliance Division, Procurement and Production (P&P) Directorate, provided guidance concerning the study approach and local procurement operations and served as the principal source of data.

2. METHODOLOGY DEVELOPMENT

The need for some form of "work measurement standard" to relate the effort required to produce a given level of output was recognized early in the study. Guidance from the P&P Directorate of DARCOM indicated

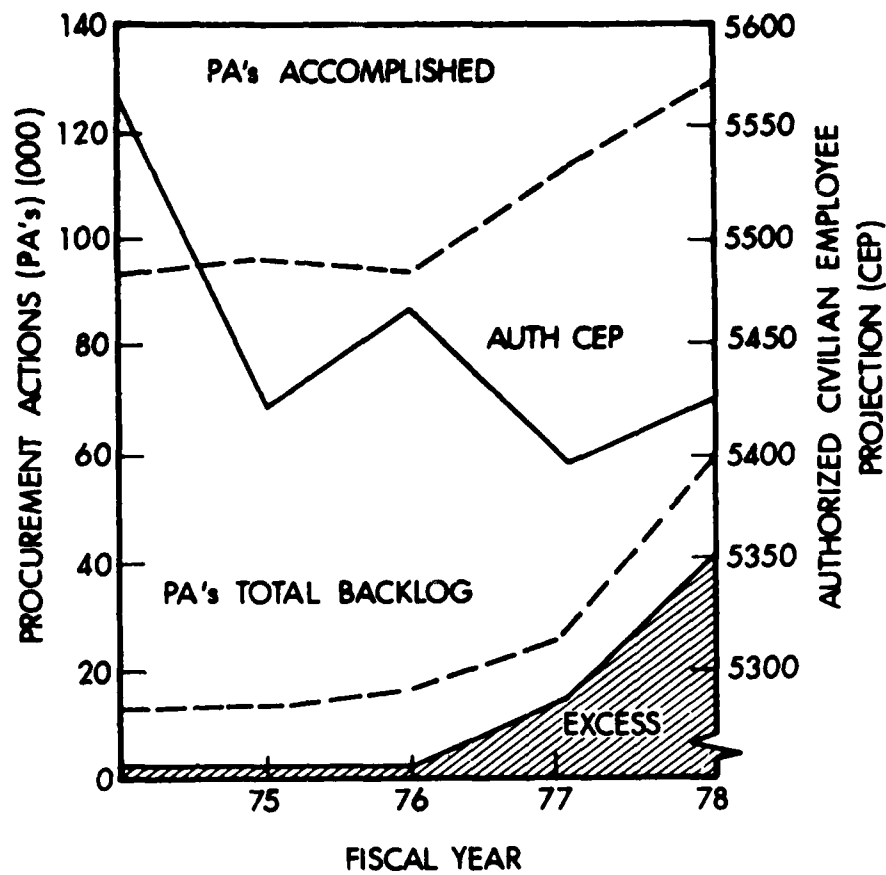


Figure 1.1 Comparison of Procurement Actions, Authorized Civilian Employee Projection, and Backlog of Procurement Actions; Within DARCOM by Fiscal Year.

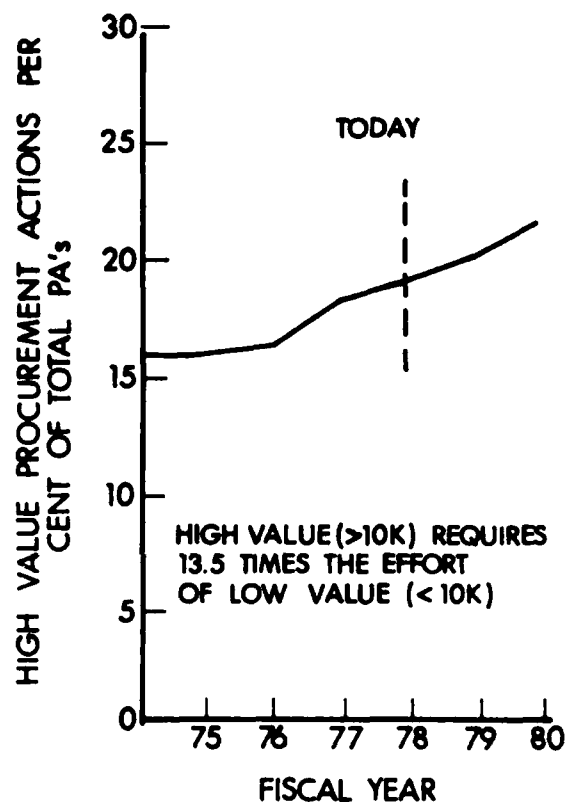
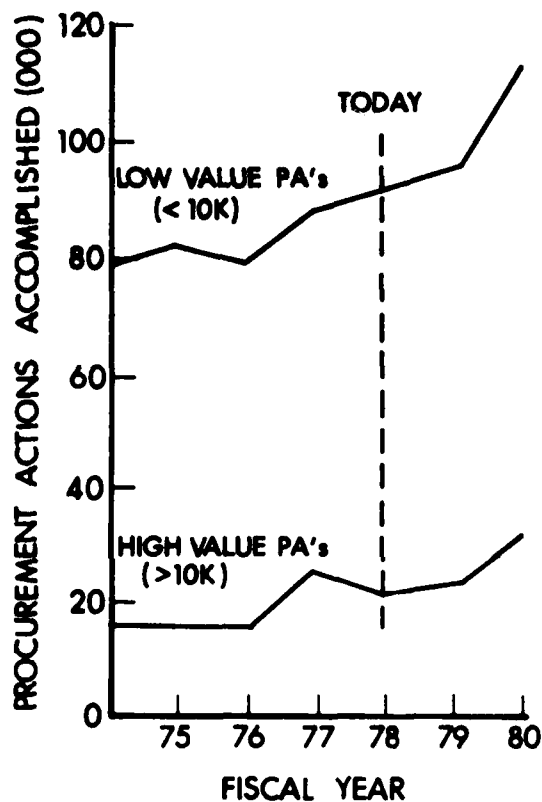


Figure 1.2 Procurement Actions Accomplished and High Value Procurement Actions, as Per Cent of Total Procurement Actions; Within DARCOM By Fiscal Year.

that no such standard existed and that such an absolute standard would be almost impossible to develop due to the often fragmented effort required in procurement operations. However, an alternative was proposed. The Army Procurement Research Office (APRO) Study, "Measuring Productivity in DARCOM's Central Procurement Offices" (Reference 2), had developed "weights" which describe the relative level of effort expended in performing different tasks in the Procurement Operations and Contract Administration Subelements. The following sections describe the application of the APRO study results to the development of a methodology to predict the level of effort required to accomplish the workload in these two AMS subelements.

2.1 Procurement Operations (721113.1).

Prior to the APRO Study the total number of Procurement Work Directives (PWD's) AWARDED was used as the primary output measure for the Procurement Operations subelement. The use of this gross measure was inadequate for two reasons. First, that measure failed to recognize the different levels of effort required to award PWD's of differing dollar amounts with the various methods of procurement. Secondly, such a measure failed to account for significant portions of the work performed under 721113.1. That is, while the awarding of PWD's is an important task of a central procurement activity, much effort is also expended on PWD's which are either CANCELLED or TRANSFERRED to another activity before AWARD can take place. Any valid measure of the output produced under the 721113.1 subelement must therefore, account for PWD's which are AWARDED, CANCELLED or TRANSFERRED, the three categories which collectively comprise Procurement Line Items Processed.

In order to overcome the deficiencies of the previously used output measures for 721113.1, the leaders of the APRO Study gathered together "experienced" procurement personnel from each DARCOM Central Procurement Activity. This group, based on their collective experience, developed through a modified DELPHI procedure, weights which describe the relative level of effort required to award a PWD which may be characterized by its dollar value and method of procurement. However, prior to developing these weights the group concluded that the then used dichotomy of "over" and "under" \$10K was not sufficient for classifying the dollar value of awarded PWD's. That is, different amounts of effort were felt to be required to award PWD's of widely differing dollar values, primarily above the \$10K level, even for the same method of procurement. This conclusion led to the definition of the four dollar value intervals: <\$10K, \$10K-\$99K, \$100K-\$999K, and >\$1,000K.

(2) Correia, Charles A., and Kelsey, Frank; Measuring Productivity in DARCOM's Central Procurement Offices; APRO 509-5, Feb 78; USA Logistics Management Center, Fort Lee, VA.

For each of these four intervals and the eight methods of procurement, the APRO study team developed a weight which describes the relative level of effort required to AWARD such a PWD. These weights, each lying between 1 and 100 are given in Table 2.1A.

When developing weights for describing the effort required for PWD's TRANSFERRED, the group concluded that the over and under \$10K categories were sufficient and further that no specification as to method of procurement was required. The weights derived for PWD's TRANSFERRED then are 3 and 15, for under and over \$10K respectively, as shown in Table 2.1B.

The final segment of Procurement Line Processed is CANCELLED PWD's, and these may represent a significant portion of the workload of a Central Procurement Activity. The APRO Study team reviewed CANCELLED PWD man-effort data and coupled with their experience concluded that the appropriate weight for a CANCELLED PWD was 50% of the weight given to an AWARD, for the same dollar value and method of procurement. Thus, a CANCELLED PWD of \$200K, for GOCO Competitive Negotiation, would receive a weight of 50, exactly one-half of the weight assigned to the award of such a PWD.

The weights described in the previous paragraphs represent the relative level of effort required to perform the three functions of the 721113.1 sub-element, namely PWD AWARD, CANCELLATION and TRANSFER. These can now be used to describe the methodology for estimating the man-years of effort required to accomplish a projected workload of a P&P Directorate. This methodology is described in the following section of this report.

2.1.1 721113.1 Man-Year Estimation Methodology. Figure 2.1 presents the general approach for estimating the level of effort required to accomplish the projected 721113.1 workload for a particular central procurement activity. The methodology or model, the center column in the figure, uses historical information concerning an individual command's workload and performance. Input to the model, shown on the left, are data which describe the current state of affairs of the central procurement activity and those it services. When the "model" is exercised using these data an estimate of the ".1" effort required to accomplish the anticipated workload is produced.

Let us now consider in more detail the historical data and input outlined on Figure 2.1.

2.1.2 Historical Data Required. The data and relationships required describe how a command's ".1" workload for a future period can be estimated and the efficiency with which such workload has been accomplished in the past. It must be emphasized that due to the variability of workload and efficiency which exists among commands, broad generalities over all of DARCOM may be of little value. The following paragraphs describe more fully the historical relationships identified in Figure 2.1.

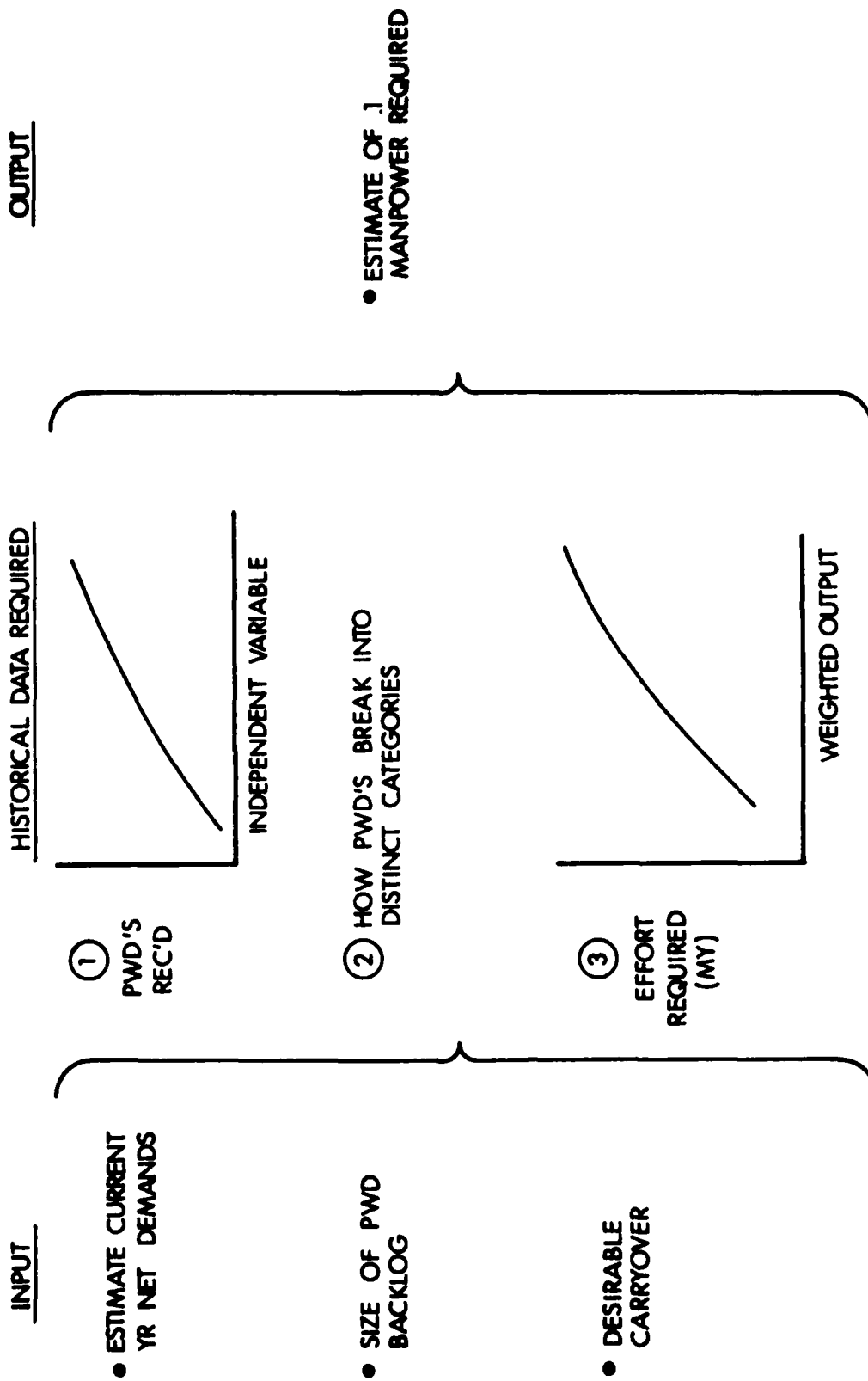


Figure 2.1 General Procurement Operations Methodology (721113.1)

TABLE 2.1 APRO STUDY ASSIGNED WEIGHTS FOR PROCUREMENT OPERATIONS

TABLE 2.1A PMD AWARDS				
CODE*	>\$1,000,000	\$100K-\$999K	\$10K-\$99K	<\$10K
1	60	60	50	5
2	96	96	90	5
3	95	90	75	5
4	90	80	65	5
5	90	80	65	5
6	90	80	65	5
7	100	100	80	5
8	3	3	2	1

*CODE	METHOD OF PROCUREMENT	*CODE	METHOD OF PROCUREMENT
1	Formal Advertising	5	Non-Competitive Negotiation
2	Two-Step Formal Advertising	6	GOCO Plant; Non-Comp Neg.
3	Competitive Negotiation	7	GOCO-Competative Negotiation
4	Commercial/Sole Source	8	Orders Issued Against Indefinite Delivery Type Contracts.

TABLE 2.1B
PMD TRANSFERRED

< \$10K	>\$10K
3	15

PMD CANCELLED

50 PERCENT OF PMD AWARD WEIGHT

1.* Some means is required for estimating, from an independent variable, the number of new PWD's which will be presented to a P&P Directorate during the period of interest. For a readiness command this number may be related to the total number of fielded items or systems, or perhaps to the number of requisitions expected during the period. For an R&D Command the number of PWD's might more closely relate to the number of systems being developed, the size of the Command's RDT&E budget or other independent variables. If such a relationship is found to exist, which is in fact logically plausible and not simply statistically significant, then with an estimate for the independent variable for the period of interest a projection of the new PWD's to be received can be made.

2.* However, in order to describe "workload" it is not sufficient to know simply how many PWD's are received by a P&P Directorate. We must know historically, how the incoming PWD's for a particular command have partitioned themselves into AWARDS, CANCELLATIONS and TRANSFERS and further within each of these categories, the relative percentages which fall into each combination of dollar value interval and method of procurement.

This type information is most definitely command specific. Clearly, each command will have different trends in the way that its total number of PWD's breaks down into the different categories.

Once the trend for the command of interest is identified the new PWD's and those carried over from the previous period can be distributed according to that trend. If one then subtracts the PWD's that would be contained in the "Desirable Carryover" to the next period, estimates would be available of the numbers of PWD's to be AWARDED, CANCELLED and TRANSFERRED, by dollar value and method of procurement. These numbers then describe the work to be accomplished in 721113.1 in order that the P&P Directorate leave the period of interest with an acceptable backlog of PWD's to be processed.

3.* The third relationship describes the efficiency with which the command of interest has, historically, been able to accomplish its workload. This relationship is based on the ability to quantitatively describe the 721113.1 workload accomplished in previous periods. This can be done by utilizing the APRO study weights and historical data for the command of interest. Consider the following equation:

* Numbers refer to elements of Figure 2.1

$$721113.1 \text{ output (FYXX)} = \sum_{i=1}^{32} W_i N_i + \sum_{i=1}^{32} \left(\frac{W_i}{2} \right) M_i + 3K_1 + 15K_2 \quad (1)$$

AWARDS

CANCELLATIONS

TRANSFERS

Note that there are terms which pertain to each element of Procurement Line Items Processed for a particular period, i.e., FYXX. The first term is a sum which relates to PWD AWARDS and may be explained in the following way. N_i represents the number of AWARDS made during FYXX for a particular combination of dollar value interval and method of procurement. W_i is the weight, as shown in Table 2.1A, which describes the relative effort required to AWARD each such PWD. The product, $W_i N_i$, therefore, is representative of the total effort expended in FYXX in the award of PWD's for that particular combination of dollar value interval and method of procurement. As the subscript i moves from 1 to 32, all such combinations are considered. The resulting sum therefore, describes the AWARD workload accomplished in FYXX by the central procurement activity being considered.

The second term is similar to the first but corresponds to PWD CANCELLATIONS. Here M_i is the number of PWD's of a specific dollar value interval and method of procurement combination. $W_i/2$ is the weight (half the corresponding award weight) which the APRO Study attributed to each such CANCELLATION. Summing over all combinations yields the total CANCELLATION workload accomplished during FYXX.

The final two terms correspond to TRANSFERS. K_1 and K_2 are, respectively, the numbers of PWD's under and over \$10K which were TRANSFERRED during FYXX, 3 and 15 are the corresponding weights as developed in the APRO Study.

Depending upon the data base, such an output measure should be obtainable for recent years. If for each such year, the output is plotted versus the man-years expended to achieve that output a trend should start to emerge which will relate the two. With such a trend, if we are presented with an estimate of the workload -- in terms of weighted output which is to be accomplished say in the next fiscal year, we can estimate the level of effort required by that command to accomplish that workload. That estimate is of course the output of this segment of the methodology.

Later in this report, we will utilize the methodology to estimate the man-years of effort required to support TARCOM's FY79 721113.1 workload. However, we will now consider the APRO Study results concerning contract administration.

2.2 Contract Administration (721113.2).

The procurement experts who participate in the APRO Study also developed weights to describe the relative levels of effort required to perform the tasks the Contract Administration sub-element 721113.2. These weights are given in Table 2.2. The weights are separated depending upon whether the work being performed is contract management or directing the actual production of goods.

It may be noticed that these weights all lie between 1 and 20. The APRO Study participants felt that this range was adequate to discriminate among the efforts required to accomplish all ".2" tasks. It must be pointed out, however, that the weights in Table 2.2 CANNOT be related to or combined with, those in Table 2.1.

This fact and the unavailability of data which give the numbers of the different types of ".2" actions actually performed, led TARCOM to suggest alternative approaches for estimating its ".2" workload and the efficiency with which it is performed. Those approaches will be described later in this report. However, it appears that future efforts aimed at quantifying the workload performed in 721113.2 would be highly desirable.

3. APPLICATION OF METHODOLOGY TO TARCOM

3.1 Procurement Operations (721113.1).

In this section we describe the historical relationship for TARCOM which are resulted by the estimation methodology depicted in Figure 2.1.

(1) From Figure 2.1 it may be noted that the methodology first requires some relationship between an "independent" variable and the number of new PWD's received by the command. Based upon their experience, TARCOM P&P personnel indicated that such a relationship existed between requisitions (also called Requisition Line Items) and new PWD's received. A plot of these variables for FY68 through FY78 is given in Figure 3.1.

When all data are considered, there appears to be little if any relationship between the two variables. However, if we partition the time frame into two periods, namely, FY68-FY74 and FY75-FY78, two distinct but rather strong relationships are seen to exist. The difference between these relationships is attributable to the following factors. First, during FY74 the TARCOM Materiel Management Directorate initiated a Fixed Re-Order Program in which they combined requisitions from different sources for the same item, thereby reducing the number of PWD's resulting. Also, the latter data set, which has a smaller slope than the first, i.e. indicates that a smaller number of PWD's associated with a fixed number of line items reflects the change in demands during peace (FY75-FY78) and war (FY68-FY74).

TABLE 2.2 APRO STUDY ASSIGNED WEIGHTS FOR CONTRACT ADMINISTRATION

<u>PRODUCTION</u>				
<u>Commands</u>	<u>Type of Document</u>			
	<u>Purchase Orders</u>	<u>Delivery Orders</u>	<u>Orders Under BOA</u>	<u>Contracts</u>
Readiness	1	1	10	15
Development	1	1	10	15

<u>CONTRACT MANAGEMENT</u>				
<u>Commands</u>	<u>Type of Document</u>			
	<u>Purchase Orders</u>	<u>Delivery Orders</u>	<u>Orders Under BOA</u>	<u>Contracts</u>
Readiness	1	1	15	20
Development	1	1	15	20

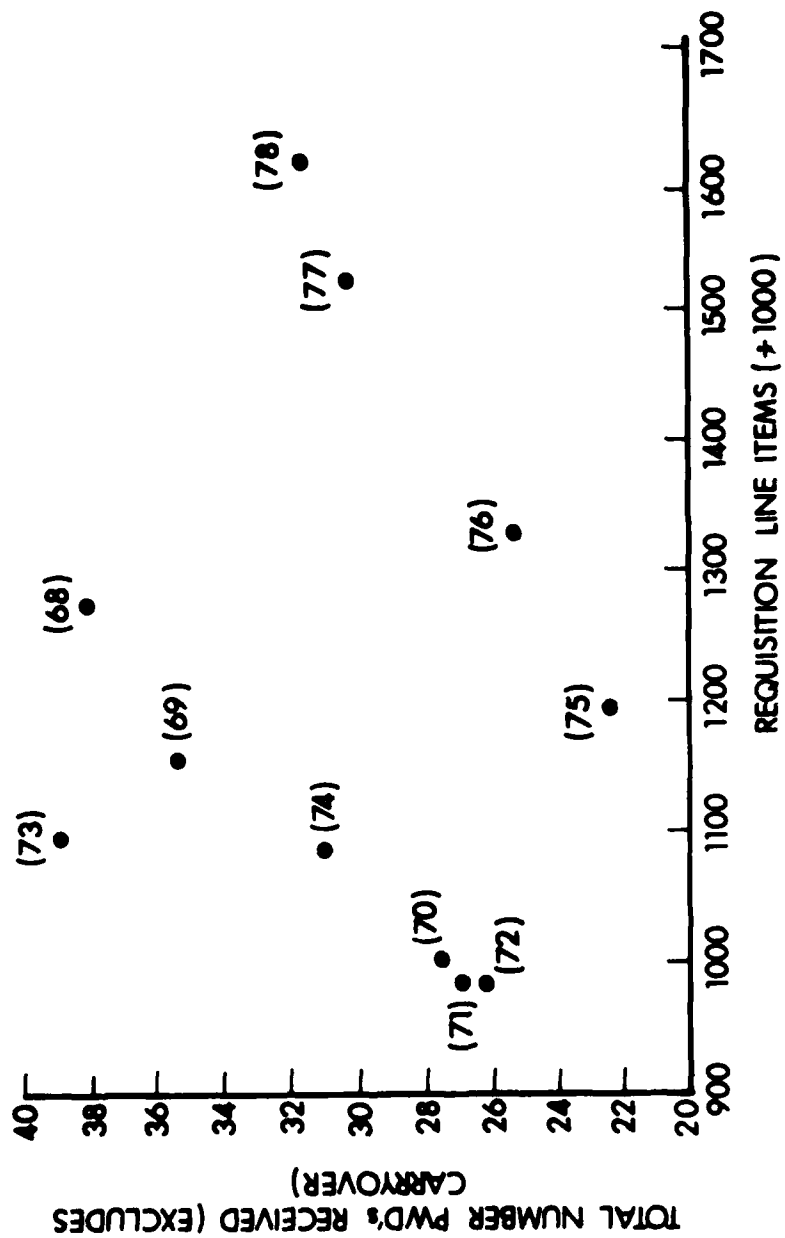


Figure 3.1 TARCOM Requisition Line Items Versus PWD's Received for

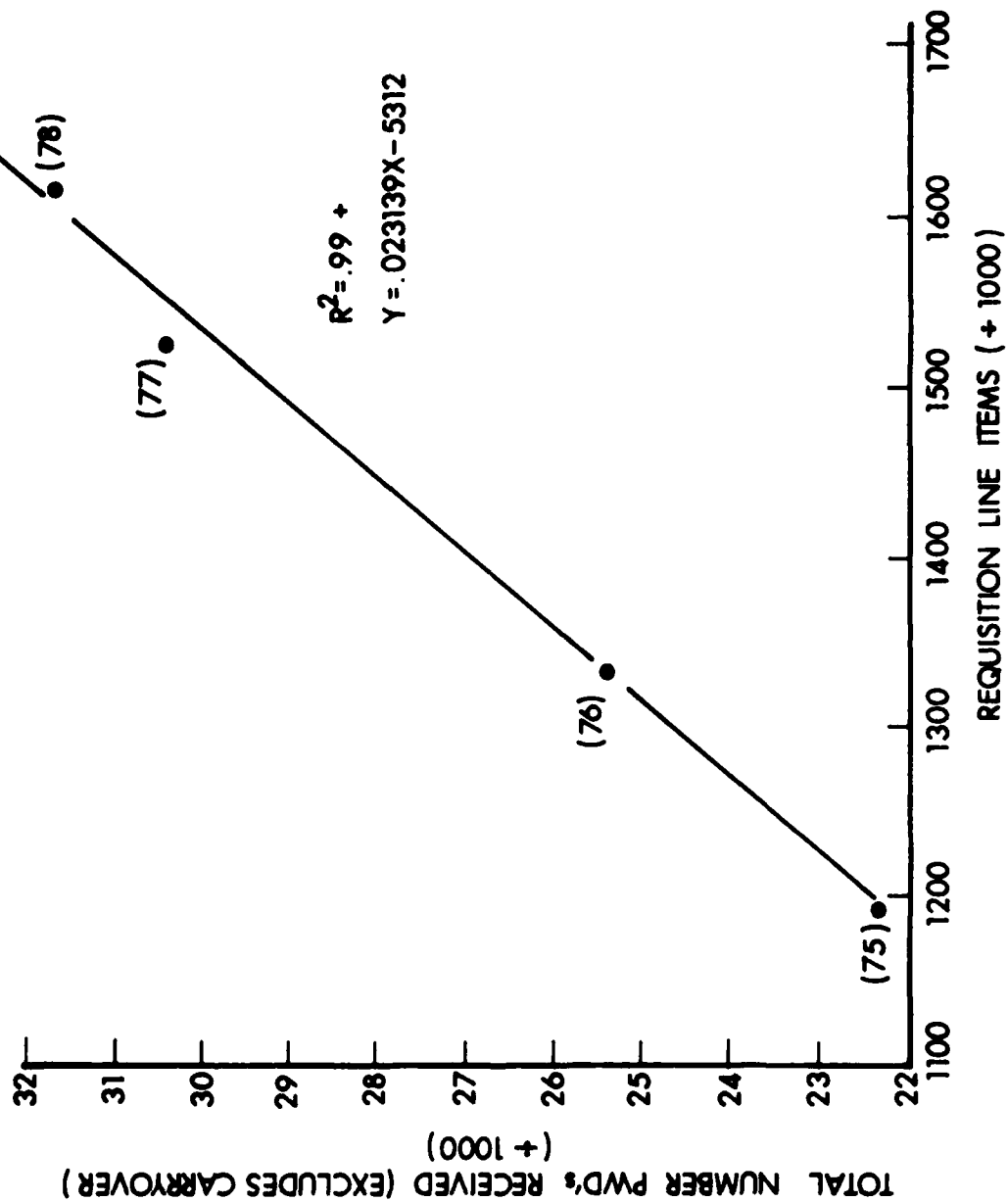


Figure 3.2 TARCOM Requisition Line Items versus PWD's Received for

When the data for the second time period are plotted. Figure 3.2, an almost perfect correlation is seen to exist between the two variables. The perfect correlation is seen to exist between the two variables. The least squares equation linking new PWD's received to Requisition Line Items is also given on Figure 3.2. With this relationship established, a projection of the requisitions expected in FY79, one could produce an estimate of the new PWD's which will come to TARCOM for processing.

(2) Data which describe how TARCOM's PWD's break into distinct categories are also required. The Central Procurement Workload Report, AMCRP-127, was used by the TARCOM P&P Directorate to generate a breakdown of the number of PWD's processed during FY75-78 for over and under \$10K AWARDS, TRANSFERS, and CANCELLATIONS by the eight methods of procurement. Table 3.1 is a summary of percent of PWD's awarded. This table shows that there is a very high degree of consistency, over the period considered, regarding the percentages of PWD's awarded under and over \$10K and for all methods of procurement. Similar consistencies were found in the summaries of PWD's TRANSFERRED and CANCELLED as well.

The data in Table 3.1 are used in the following way. For a given number, X , of new incoming PWD's we need to estimate, for example, the percentage which will result in over \$10K AWARDS, made by the fourth method of procurement. Table 3.1 indicates that for FY75 through FY78, the percentages of Procurement Line Stems Processed which fell into this category were 0.06, 0.06, 0.07 and 0.05 respectively. A simple average of these numbers indicates that approximately 6% or 6 of each 100 new PWD's fell into that particular award category. We can generate similar percentages for the other categories of PWD AWARDS and for CANCELLATIONS and TRANSFERS as well.

With such percentages in hand one can determine the average 721113.1 weighted workload which TARCOM must accomplish for each new 100 PWD's to be processed by utilizing equation (1). In this computation N_i , for example, is the percentage of new PWD's which result in the i th combination of dollar value and method of procurement, times 100. The weights, of course remain as previously defined, except that since no historical data exist for dollar values except as above or below \$10K, the weights used for the category above \$10K are taken from the column labeled \$10K-\$99K in Table 2.1A.

The computation indicates that, historically, each 100 new PWD's entering TARCOM result in approximately 1849 units of 721113.1 workload. It must again be pointed out that such a characterization applies only to TARCOM and other commands might well have widely differing factors.

(3) TARCOM's weighted ".1" workload (adjusted to exclude R&D procurement actions) and corresponding man-years of effort expended are plotted in Figure 3.3. The trend on this plot between FY75 and FY76

TABLE 3.1 TARCOM PWD AWARD BREAKDOWN*

	<u>METHOD OF PROCUREMENT</u>							
	1	2	3	4	5	6	7	8
<u>UNDER \$10K AWARD</u>								
FY75	.03	-	.53	.16	-	-	-	.01
FY76	.02	-	.58	.07	.01	-	-	.01
FY77	.03	-	.53	.10	-	-	-	.01
FY78	.02	-	.54	.09	-	-	-	.01
								TOTALS
								.73
								.68
								.67
								.66
<u>OVER \$10K AWARD</u>								
FY75	.09	-	.06	.06	-	-	-	.01
FY76	.11	-	.07	.06	-	-	-	-
FY77	.10	-	.11	.07	-	-	-	-
FY78	.12	-	.04	.05	-	-	-	.02
								.23
								.25
								.28
								.24

*Calculated from data in Central Procurement Workload Report AMCRP-127

NOTE: Similar consistency was found for transfers and cancellations.

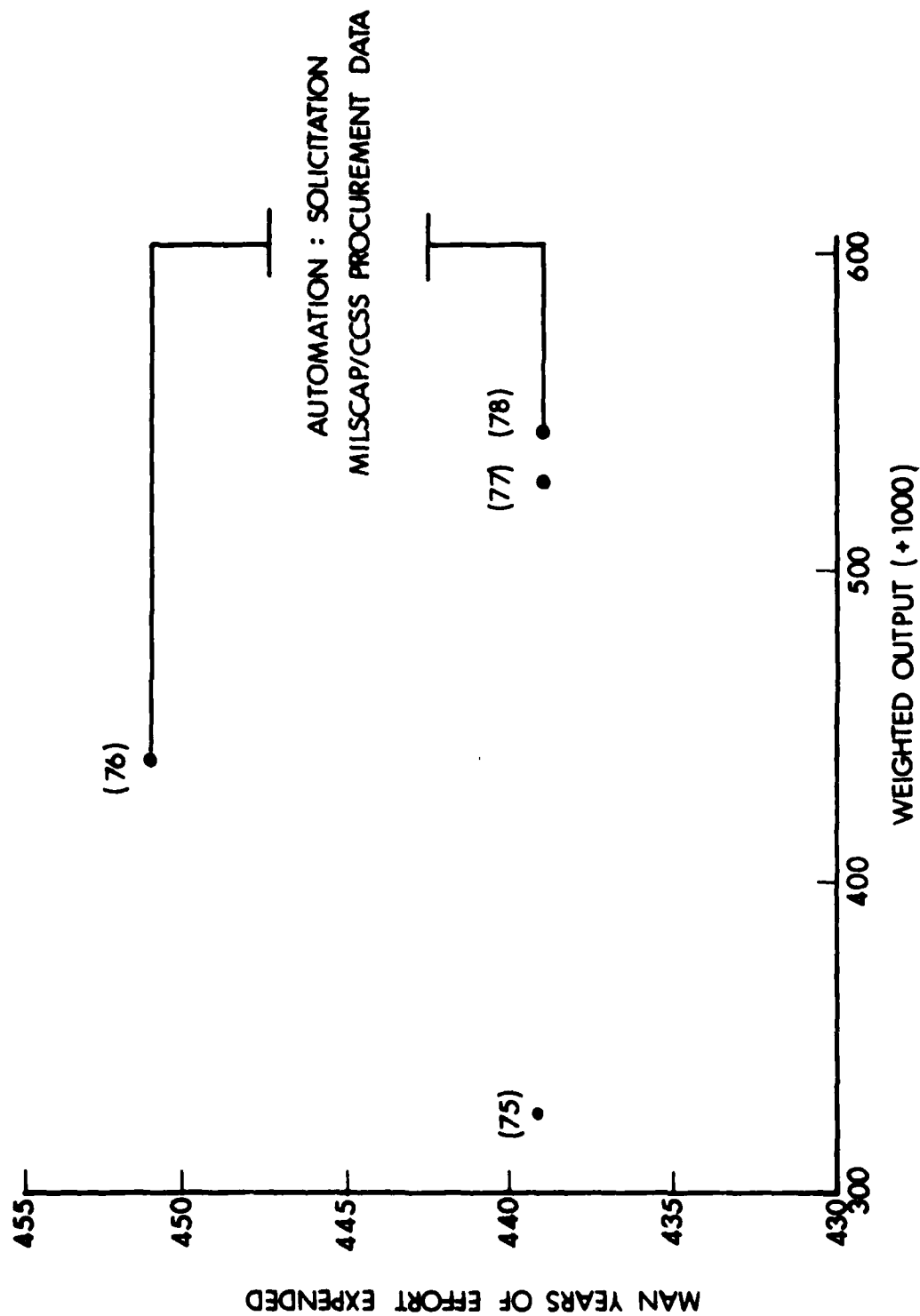


Figure 3.3 Weighted Output for TARCOM Procurement Operations versus Effort Expended.

seems reasonable. That is, more work, in terms of weighted output, was produced in FY76 and more man-years of effort were required. However, a drastic change occurred between FY76 and FY77, when a significant increase in workload accomplished, or output, occurred while the man-years expended decreased. TARCOM explains this change as being caused primarily by the automation of several portions of the procurement process.

The growth in the weighted output per man-year of effort expended by TARCOM personnel is plotted in Figure 3.4. These data also provide one approach for estimating the efficiency of ".1" operations in FY79. If we use a quadratic function of fiscal year to represent efficiency the fit of the equation is quite good. An extrapolation of one year provides the estimate that approximately 1238 units of ".1" output per man-year expended can be expected in FY79.

It will of course be obvious that fiscal year and efficiency of procurement operations are not casually related. Efficiency is more directly related to the degree of system automation, experience with the current system, motivation of personnel, etc. However, these variables are difficult to quantify and so we use fiscal year as a surrogate variable, in which hopefully, the effects of the other, more believable variables are combined.

Another approach is also available for estimating FY79 efficiency. This may be accomplished by augmenting the FY78 efficiency by the yearly desired gain of 2%. This procedure produces an estimated efficiency of 1259 units of weighted output per year.

At this point we have obtained the historical relationships used to describe TARCOM's 721113.1 operations. In order to estimate the man-years of effort required to accomplish the projected FY79 .1 workload, we need to estimate the new PWD's which TARCOM will receive during FY79. As described previously, the number of new PWD's has, for TARCOM, historically been related to Requisition Line Items. A plot of TARCOM's Requisition Line Items from FY68 through FY78 is given in Figure 3.5. A strikingly linear trend may be observed to occur from FY72 to the present. This growth in requisitions has been noted in the BASELINE Study, and is suspected to be caused for example, by the increasing numbers of line items and mechanized forces. If this linear relationship is extrapolated to estimate the number of requisitions expected in FY79, the result is 1,686,285. This number agrees quite well with the independent estimate of 1,700,000 derived by the TARCOM Materiel Management Directorate.

We can not utilize the methodology described in Figure 2.1 to estimate the man-years of effort required to accomplish TARCOM's FY79 721113.1 workload. The steps for deriving the estimates are summarized in Table 3.2. The estimates are 513 and 504 man-years depending upon which method was used to estimate FY79 efficiency.

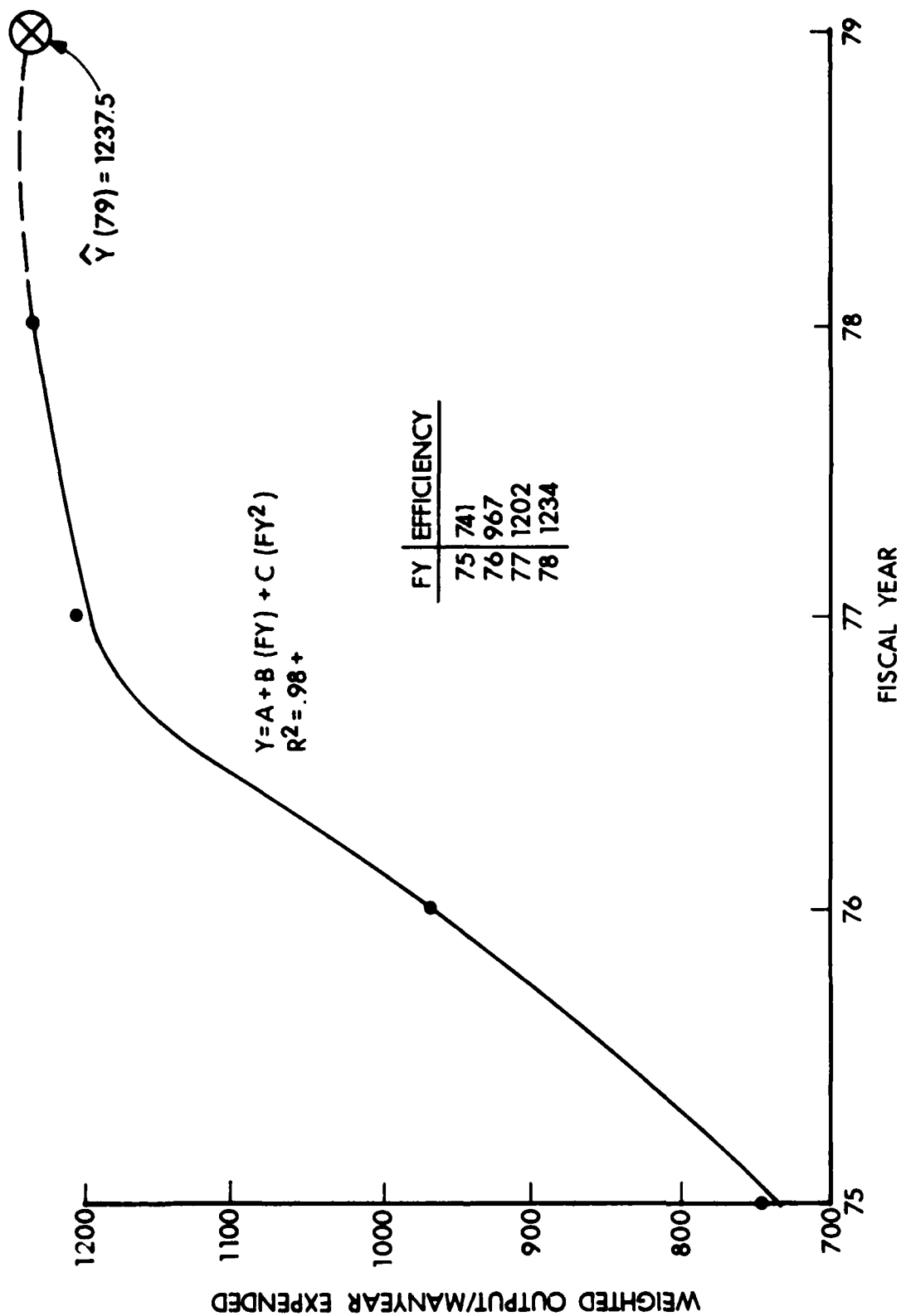


Figure 3.4 TARCOM Procurement Efficiency by Fiscal Year.

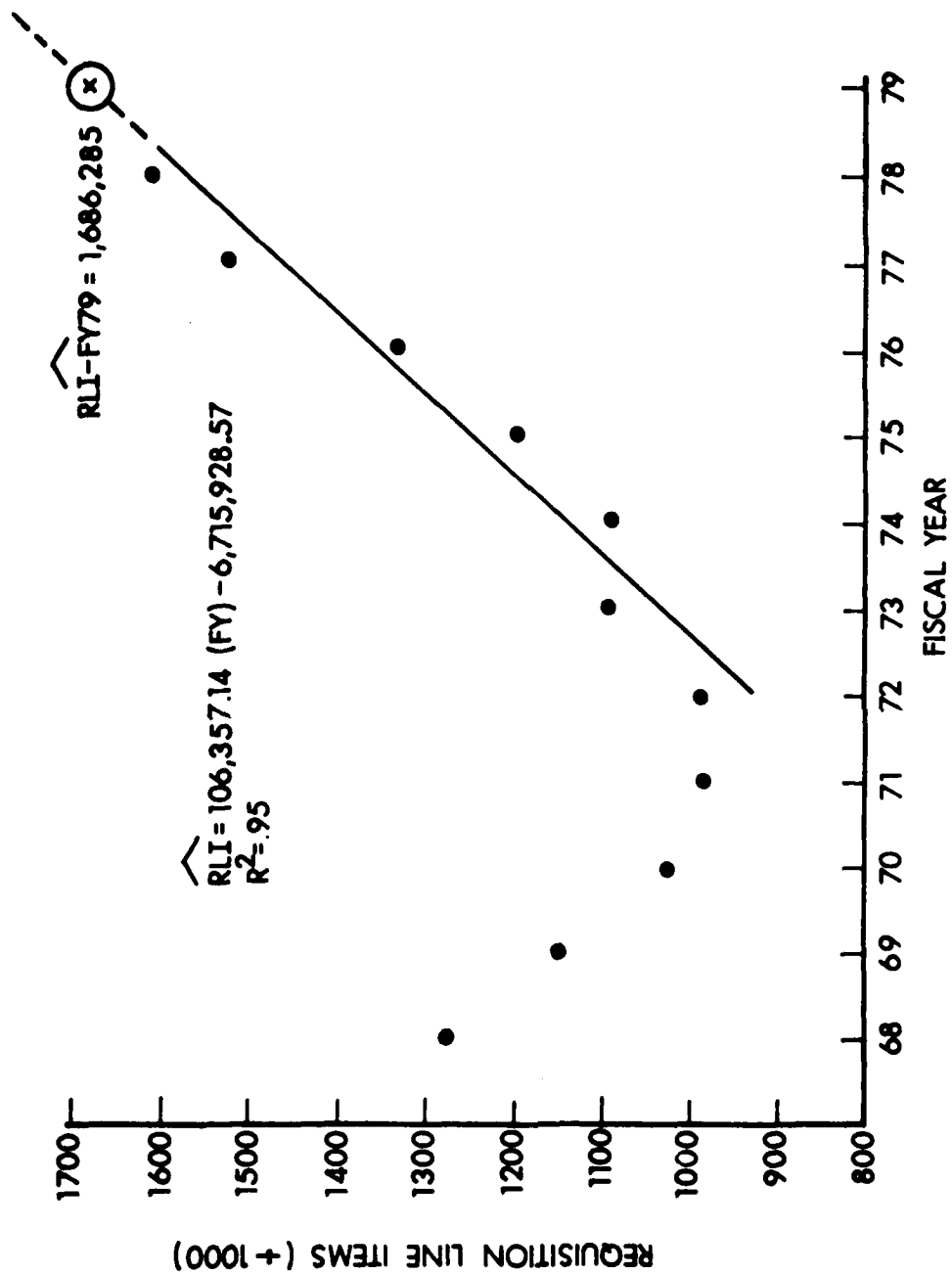


Figure 3.5 TARCOM Requisition Line Items by Fiscal Year 1968-1978.

TABLE 3.2 CALCULATIONS OF ESTIMATE OF FY79 TARCOM PROCUREMENT OPERATIONS MAN-POWER EFFORT REQUIRED

	Source
1. Estimated PMD's for FY79	
Estimate of FY79 Requisition Line Items 1,686,285	Figure 3.5
Estimate FY79 PMD's Rec'd = .023139(1,686,285) - 5312 = 33,707	Figure 3.2
PMD's Carried Over From FY78 = 6,614	TARCOM
New + Carried Over = 40,321	
Desirable Carry-Over to FY-80 = -6,000	
Estimated PMD's to be Processed During FY-79 = 34,321	
2. Estimated Weighted Workload	
34,321 PMD's X 1849 $\frac{\text{Weighted Workload}}{100 \text{ PMD's}} = 634,595 \text{ Weighted Workload}$	
(Table 3.1)	
3. TARCOM Procurement Operations Man-Power Effort Required	
a. Figure 3.4 $\frac{634,595}{1237.5 \text{ wt/my}} = 513 \text{ Man Years}$	
b. Assumed 2 Percent Increase in Efficiency $\frac{634,595}{1258.7 \text{ wt/my}} = 504 \text{ Man Years}$	

3.2 Contract Administration (721113.2).

TARCOM proposed two alternative methods for estimating the manpower to accomplish the Contract Administration, 721113.2, workload. Both methods were based upon the perception of TARCOM personnel that the FY70-72 period was one in which the contract administration function was well* performed. This perception was based on the fact that during that period the Directorate had a separate branch to perform contract administration. Since that time, however, no such branch has existed and gradually, as the requirement to obligate funds has increased, emphasis has been switched almost exclusively to the 721113.1 subelement. The reduction in attention paid to contract administration is evident from Table 3.3. That is, the average number of contracts administered per man year is now almost twice as many as during the FY70-72 period. Clearly, our attention to this important area is faltering in the rush to obligate our current appropriations. At any rate, one method proposed for estimating the man-years of effort required for contract administration is to adopt the FY70-72 factor of 52 contracts per man-year, perhaps augmented at 2% per year to reflect the desired gains in efficiency. Therefore, by dividing the number of open contracts in FY79 by this factor one obtains an estimate of the number of man-years required for contract administration.

Another approach was based upon the finding that for FY70, 71 and 72 very nearly one-third of the man-years spent on Procurement Operations was spent on Contract Administration.

3.3 Estimate of Effort Required for TARCOM P&P Directorate FY79.

Based upon the results of the previous sections, estimates of the man-years of effort required to accomplish TARCOM's 721113.1 and .2 workloads in FY79 are provided in Table 3.5. When these estimates are compared to the authorized strength of the TARCOM P&P Directorate, the shortfall in terms of available man-years, without the use of overtime, is seen to be significant, i.e., in excess of 200 man-years.

4. CONCLUSIONS

The Central Procurement workload directly supports materiel readiness by obtaining, through contractual means, supplies, services and equipment for the Army. The current trend of an increasing backlog of procurement actions, impacts the materiel readiness of the Army by causing slippage in obligations against that planned. Any effort to reduce the backlog and increase productivity in the procurement operations function can have a negative effect on contract administration by sacrificing, deferring, or performing hastily that function.

*The period of FY70-72 is a very interesting one in DARCOM history. It has consistently been identified in other efforts, such as the BASELINE and HIGH GRADE Studies, as a period of high productivity and efficiency for DARCOM as a whole.

TABLE 3.3 TARCOM ALTERNATIVE APPROACHES FOR CONTRACT ADMINISTRATION

1. LINK TO "OPEN" CONTRACTS APPROACH

<u>TIME FRAME</u>	<u>AVERAGE NO. CONTRACTS UNDER ADMINISTRATION</u>	<u>AVERAGE CONTRACTS/MAN YEAR</u>
FY70-FY72	8885	52
FY73-FY77	13,102	99

2. LINK TO PROCUREMENT OPERATIONS WORKLOAD APPROACH

FY70-FY72	MAN YEARS SPENT ON CONTRACT ADMINISTRATION AVERAGED 33% OF THAT SPENT ON PROCUREMENT OPERATIONS
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TABLE 3.4 ESTIMATES OF FY79 TARCOM CONTRACT ADMINISTRATION MAN-POWER
EFFORT REQUIRED

TARCOM ALTERNATIVE APPROACHES

1. Link to Number "Open" Contracts (OC)

	<u>Contracts/Man Year</u>
FY70-72	52
FY79	58.56*

$$\frac{\text{FY-79 OC}}{58.56 \text{ OC/MY}} = \frac{13,000}{58.56} = 222 \text{ Man Years}$$

2. Link to Procurement Operations Workload

FY70-72 33% of Procurement Operations

Historical Effort: 513 MY x .333 = 171 MY

Normal Expected Value*: 504 MY x .333 = 168 MY

*Normal Expected Value, based on 2% productivity increase.

TABLE 3.5 COMPARISON OF ESTIMATED TARCOM PROCUREMENT AND PRODUCTION WORKLOAD

REQUIREMENTS VERSUS AUTHORIZATION			
Procurement Operations Workload (MY)	Contract Administration Workload (MY)	Total (MY)	Shortfall* (MY)
513	222	735	273
	171	684	222
504	222	726	264
	168	672	210

*FY79 TARCOM P&P authorized strength = 462. The FY79 TARCOM P&P authorized strength = 502; however, 40 personnel are engaged in only local procurement activities.

This study for TARCOM, at least, indicates that, without significant amounts of overtime, adequate personnel are not available to perform even the 721113.1 Procurement Operations Workload. This trend in the Central Procurement Workload can only lead to longer processing times for PWD's, decreasing quality of the contractual instrument and a further decline of supply management performance as measured by percent stock availability, back orders outstanding, not Operationally Ready Supply requisitions, etc.

The analysis included in this report considered Procurement Line Items Processed as being in only one of two categories, i.e., above or below \$10K. While the APRO Study indicated that such a dichotomy was not sufficiently detailed, more refined data were unavailable. It may be noted however, that the format of the DARCOM 127 Report has been modified to accommodate all four dollar value intervals suggested in the APRO Study. Refinement of the Study to consider all four dollar value categories would be desirable once sufficient data are collected.

In order to justify future manpower requirements in other than procurement operations, it would be highly desirable to attempt to quantify the benefits derived from a conscientious Contract Administration Program.

Finally, it is felt by the authors that the general methodology developed in this report can be applied to all Central Procurement Activities. However, data and relationships must be obtained in order to adequately characterize the workload composition and efficiency of individual activities.

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